

CLAIMS:

1. A multilayer article assembly comprising (i) a coating layer comprising a block copolyestercarbonate comprising structural units derived from at least one 1,3-dihydroxybenzene and at least one aromatic dicarboxylic acid, (ii) a second layer comprising a polymer comprising carbonate structural units, (iii) an adhesive layer comprising a polyurethane, and (iv) an uncured thermoset or uncured cyclic oligomer substrate layer, wherein the coating layer is in contiguous contact with the second layer, and the adhesive layer is in contiguous contact with the second layer and the substrate layer.
2. The assembly of claim 1 wherein the coating layer comprises at least one 1,3-dihydroxybenzene selected from the group consisting of unsubstituted resorcinol, 2-methyl resorcinol, and mixtures thereof.
3. The assembly of claim 2 wherein the 1,3-dihydroxybenzene is unsubstituted resorcinol.
4. The assembly of claim 1 wherein the aromatic dicarboxylic acid is selected from the group consisting of isophthalic acid, terephthalic acid, naphthalene-2,6-dicarboxylic acid, and mixtures thereof.
5. The assembly of claim 4 wherein the aromatic dicarboxylic acid is a mixture of isophthalic acid and terephthalic acid.
6. The assembly of claim 5 wherein the ratio of isophthalic-derived structural units to terephthalic-derived structural units is about 0.25-4.0 : 1.
7. The assembly of claim 5 wherein the ratio of isophthalic-derived structural units to terephthalic-derived structural units is about 0.40-2.5 : 1.
8. The assembly of claim 1 wherein the copolyestercarbonate comprises about 10% to about 99% by weight arylate blocks.
9. The assembly of claim 1 wherein the copolyestercarbonate comprises about 60% to about 98% by weight arylate blocks.

10. The assembly of claim 1 wherein the carbonate portion of the copolyestercarbonate comprises structural units derived from bisphenol A.
11. The assembly of claim 1 wherein the second layer comprises a bisphenol A polycarbonate.
12. The assembly of claim 1 wherein the second layer further comprises at least one colorant selected from the group consisting of dyes, pigments, metal flakes, and glass flakes.
13. The assembly of claim 1 wherein the adhesive layer comprises at least one polyurethane comprising structural units derived from at least one polyol selected from the group consisting of polyether polyols, polyester polyols, polytetramethylene ether glycol, hexamethylene glycol and polyols based on polybutadiene.
14. The assembly of claim 13 wherein the polyurethane comprises structural units derived from methylene diphenyl diisocyanate or methylene bis(cyclohexyl) diisocyanate.
15. The assembly of claim 1 wherein the polyurethane comprises an aliphatic polyurethane film.
16. The assembly of claim 1 wherein the adhesive layer comprises a block copolymer comprising a thermoplastic polyurethane block and at least one block comprising structural units derived from styrene.
17. The assembly of claim 16 wherein the block comprising structural units derived from styrene comprises a hydrogenated styrene-diene block.
18. The assembly of claim 1 wherein the substrate layer comprises at least one material selected from the group consisting of epoxys, cyanate esters, unsaturated polyesters, diallylphthalate, acrylics, alkyds, phenol-formaldehyde, novolacs, resoles, bismaleimides, PMR resins, melamine-formaldehyde, urea-formaldehyde, benzocyclobutanes, hydroxymethylfurans, isocyanates, cyclic polyester oligomers, cyclic poly(butylene terephthalate) oligomers, cyclic poly(ethylene terephthalate)

oligomers, cyclic polycarbonate oligomers, cyclic bisphenol A polycarbonate oligomers, and cyclic polyetherimide oligomers.

19. The assembly of claim 18 wherein the substrate layer further comprises a filler selected from the group consisting of glass fibers, carbon fibers, at least one thermoplastic resin, and mixtures thereof.

20. The assembly of claim 1 wherein the substrate layer comprises a filled material selected from the group consisting of reaction injection molding (RIM) compound, long fiber injection polyurethane (LFI-PU) foam, sheet-molding compound (SMC), bulk molding compound (BMC), thick molding compound (TMC), cyclic poly(butylene terephthalate) oligomers, cyclic bisphenol A polycarbonate oligomers, and an acrylic ester-derived thermoset resin comprising a polyphenylene ether.

21. The assembly of claim 1 wherein the multilayer article exhibits a ninety-degree peel strength of at least 700 Newtons per meter following curing of the substrate material.

22. The assembly of claim 21 wherein the multilayer article exhibits a ninety-degree peel strength of at least 1750 Newtons per meter following curing of the substrate material.

23. The assembly of claim 1 wherein thicknesses of layers are: a coating layer of about 2-2,500 microns; a second layer of about 2-2,500 microns; and an adhesive layer of about 8-2,500 microns.

24. The assembly of claim 1 which, following curing of the substrate layer, is an OVAD device; exterior or interior component for aircraft, automotive, truck, military vehicle; military automobile, military aircraft, military water-borne vehicle, scooter, motorcycle, including a panel, quarter panel, rocker panel, vertical panel, horizontal panel, trim, pillar, center post, fender, door, decklid, trunklid, hood, bonnet, roof, bumper, fascia, grill, mirror housing, pillar applique, cladding, body side molding, wheel cover, hubcap, door handle, spoiler, window frame, headlamp bezel, headlamp, tail lamp, tail lamp housing, tail lamp bezel, license plate enclosure, roof

rack, or running board; an enclosure, housing, panel, or part for outdoor vehicles and devices; a wind turbine blade or housing; an enclosure for an electrical or telecommunication device; outdoor furniture; aircraft component; exterior or interior component for a boat or item of marine equipment, including trim, an enclosure, or housing; an outboard motor housing; depth finder housing, personal water-craft; jet-ski; pool; spa; hot-tub; step; step covering; a building or construction application including glazing, roof, window, floor, decorative window furnishing or treatment; a treated glass cover for a pictures, paintings, poster, or display item; an optical lens; ophthalmic lens; corrective ophthalmic lens; implantable ophthalmic lens; a wall panel or door; a counter top; protected graphic; an outdoor or indoor sign; an enclosure, housing, panel, or part for an automatic teller machine (ATM); an enclosure, housing, panel, or part for a lawn or garden tractor, lawn mower, or tool, including a lawn or garden tool; window or door trim; an item of sports equipment or a toy; an enclosure, housing, panel, or part for a snowmobile; a recreational vehicle panel or component; an item of playground equipment; an article made from plastic-wood combinations; a golf course marker; a utility pit cover; a computer housing; a desk-top computer housing; a portable computer housing; a lap-top computer housing; a palm-held computer housings; a monitor housing; a printer housing; a keyboard; a FAX machine housing; a copier housing; a telephone housing; a phone bezel; a mobile phone housing; a radio sender housing; a radio receiver housing; a light fixture; lighting appliance; reflector; network interface device housing; transformer housing; air conditioner housing; cladding or seating for public transportation; cladding or seating for a train, subway, or bus; a meter housing; antenna housing; cladding for satellite dishes; an coated helmet or item of personal protective equipment; a coated synthetic or natural textile; coated photographic film or photographic print; a coated painted article; coated dyed article; coated fluorescent article; or coated foam article.

25. A multilayer article assembly comprising (i) a coating layer comprising a block copolyestercarbonate comprising structural units derived from unsubstituted resorcinol, a mixture of isophthalic acid and terephthalic acid, and bisphenol A; (ii) a second layer comprising a bisphenol A polycarbonate optionally containing at least

one colorant, (iii) an adhesive layer selected from the group consisting of a polyurethane, an aliphatic polyurethane film, and a block copolymer comprising a thermoplastic polyurethane block and at least one block comprising structural units derived from styrene, and (iv) a substrate layer selected from the group consisting of an uncured thermoset resin and an uncured cyclic oligomer;

wherein the coating layer is in contiguous contact with the second layer, and the adhesive layer is in contiguous contact with the second layer and the substrate layer; and wherein the multilayer article assembly following curing of the substrate material exhibits a ninety-degree peel strength of at least 700 Newtons per meter.

26. A method for making a multilayer article assembly comprising (i) a coating layer comprising a block copolyester carbonate comprising structural units derived from at least one 1,3-dihydroxybenzene and at least one aromatic dicarboxylic acid, (ii) a second layer comprising a polymer comprising carbonate structural units, (iii) an adhesive layer comprising a polyurethane, and (iv) an uncured thermoset or uncured cyclic oligomer substrate layer, wherein the coating layer is in contiguous contact with the second layer, and the adhesive layer is in contiguous contact with the second layer and the substrate layer;

which method is selected from the group consisting of the method (i) comprising the steps of (a) preparing a pre-assembly of coating layer and second layer, and (b) combining said pre-assembly with separate adhesive layer and substrate layer; the method (ii) comprising the steps of (a) preparing a pre-assembly of coating layer and second layer, (b) forming the adhesive layer adjacent to the substrate layer, and (c) combining said pre-assembly with the adhesive layer / substrate layer combination; and the method (iii) comprising the steps of (a) preparing a pre-assembly of coating layer, second layer, and adhesive layer, and (b) forming said pre-assembly adjacent to the substrate layer.

27. The method of claim 26 wherein the pre-assembly of coating layer and second layer is formed by coextrusion.

28. The method of claim 26 wherein forming said pre-assembly adjacent to the adhesive layer is performed by extrusion coating, lamination or compression molding.

29. The method of claim 26 wherein the coating layer comprises at least one 1,3-dihydroxybenzene selected from the group consisting of unsubstituted resorcinol, 2-methyl resorcinol, and mixtures thereof.

30. The method of claim 29 wherein the 1,3-dihydroxybenzene is unsubstituted resorcinol.

31. The method of claim 26 wherein the aromatic dicarboxylic acid is selected from the group consisting of isophthalic acid, terephthalic acid, naphthalene-2,6-dicarboxylic acid, and mixtures thereof.

32. The method of claim 31 wherein the aromatic dicarboxylic acid is a mixture of isophthalic acid and terephthalic acid.

33. The method of claim 32 wherein the ratio of isophthalic-derived structural units to terephthalic-derived structural units is about 0.25-4.0 : 1.

34. The method of claim 32 wherein the ratio of isophthalic-derived structural units to terephthalic-derived structural units is about 0.40-2.5 : 1.

35. The method of claim 26 wherein the copolyestercarbonate comprises about 10% to about 99% by weight arylate blocks.

36. The method of claim 26 wherein the copolyestercarbonate comprises about 60% to about 98% by weight arylate blocks.

37. The method of claim 26 wherein the carbonate portion of the copolyestercarbonate comprises structural units derived from bisphenol A.

38. The method of claim 26 wherein the second layer comprises a bisphenol A polycarbonate.

39. The method of claim 26 wherein the second layer further comprises at least one colorant selected from the group consisting of dyes, pigments, metal flakes, and glass flakes.

40. The method of claim 26 wherein the adhesive layer comprises at least one polyurethane comprising structural units derived from at least one polyol selected from the group consisting of polyether polyols, polyester polyols, polytetramethylene ether glycol, hexamethylene glycol and polyols based on polybutadiene.

41. The method of claim 40 wherein the polyurethane comprises structural units derived from methylene diphenyl diisocyanate or methylene biscyclohexyl diisocyanate.

42. The method of claim 26 wherein the polyurethane comprises an aliphatic polyurethane film.

43. The method of claim 26 wherein the adhesive layer comprises a block copolymer comprising a thermoplastic polyurethane block and at least one block comprising structural units derived from styrene.

44. The method of claim 43 wherein the block comprising structural units derived from styrene comprises a hydrogenated styrene-diene block.

45. The method of claim 26 wherein the substrate layer comprises at least one material selected from the group consisting of epoxys, cyanate esters, unsaturated polyesters, diallylphthalate, acrylics, alkyds, phenol-formaldehyde, novolacs, resoles, bismaleimides, PMR resins, melamine-formaldehyde, urea-formaldehyde, benzocyclobutanes, hydroxymethylfurans, isocyanates, cyclic polyester oligomers, cyclic poly(butylene terephthalate) oligomers, cyclic poly(ethylene terephthalate) oligomers, cyclic polycarbonate oligomers, cyclic bisphenol A polycarbonate oligomers, and cyclic polyetherimide oligomers.

46. The method of claim 45 wherein the substrate layer further comprises a filler selected from the group consisting of glass fibers, carbon fibers, at least one thermoplastic resin, and mixtures thereof.

47. The method of claim 26 wherein the substrate layer comprises a filled material selected from the group consisting of sheet-molding compound (SMC), bulk molding compound (BMC), thick molding compound (TMC), cyclic poly(butylene terephthalate) oligomers, cyclic bisphenol A polycarbonate oligomers, and an acrylic ester-derived thermoset resin comprising a polyphenylene ether.

48. The method of claim 26 wherein the multilayer article exhibits a ninety-degree peel strength of at least 700 Newtons per meter following curing of the substrate material.

49. The method of claim 48 wherein the multilayer article exhibits a ninety-degree peel strength of at least 1750 Newtons per meter following curing of the substrate material.

50. The method of claim 26 wherein thicknesses of layers are: a coating layer of about 2-2,500 microns; a second layer of about 2-2,500 microns; and an adhesive layer of about 8-2,500 microns.

51. The method of claim 26 which further comprises the step of curing the substrate material.

52. A method for making a multilayer article assembly comprising (i) a coating layer comprising a block copolyestercarbonate comprising structural units derived from unsubstituted resorcinol, a mixture of isophthalic acid and terephthalic acid, and bisphenol A; (ii) a second layer comprising a bisphenol A polycarbonate optionally containing at least one colorant, (iii) an adhesive layer selected from the group consisting of a polyurethane, an aliphatic polyurethane film, and a block copolymer comprising a thermoplastic polyurethane block and at least one block comprising structural units derived from styrene, and (iv) a substrate layer selected from the group consisting of an uncured thermoset resin and an uncured cyclic oligomer;

wherein the coating layer is in contiguous contact with the second layer, and the adhesive layer is in contiguous contact with the second layer and the substrate layer; and wherein the multilayer article assembly following curing of the substrate material exhibits a ninety-degree peel strength of at least 700 Newtons per meter.

which method is selected from the group consisting of the method (i) comprising the steps of (a) preparing a pre-assembly of coating layer and second layer, and (b) combining said pre-assembly with separate adhesive layer and substrate layer; the method (ii) comprising the steps of (a) preparing a pre-assembly of coating layer and second layer, (b) forming the adhesive layer adjacent to the substrate layer, and (c) combining said pre-assembly with the adhesive layer / substrate layer combination; and the method (iii) comprising the steps of (a) preparing a pre-assembly of coating layer, second layer, and adhesive layer, and (b) forming said pre-assembly adjacent to the substrate layer.

53. The method of claim 52 which further comprises the step of curing the substrate material.